UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2003/01421

June 23, 2004

Mr. Lawrence C. Evans
U.S. Army Corps of Engineers
Attn: John Barco
Portland District, CENWP-CO-GP
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Columbia River Sand & Gravel Dredging, Columbia River Miles 90 to 96 and 98.5 to 101, Columbia and Multnomah Counties, Oregon (Corps No. 1995000961)

Dear Mr. Evans:

Enclosed is a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) for the for the issuance of a permit to Columbia River Sand & Gravel under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act to authorize dredging in and beside the Federal navigation channel, Columbia River Miles 90 to 96 and 98.5 to 101. The Corps of Engineers (COE) determined that the action is likely to adversely affect Lower Columbia River Chinook salmon (*Oncorhynchus tshawytscha*), Columbia River chum (*O. keta*), and Lower Columbia River steelhead (*O. mykiss*) and requested formal consultation on this action. NOAA Fisheries concludes in this Opinion that the proposed action is not likely to jeopardize the continued existence of Snake River sockeye salmon (*Oncorhynchus nerka*), Snake River fall Chinook salmon (*O. tshawytscha*), Snake River spring/summer Chinook salmon, Upper Columbia River spring-run Chinook salmon, Lower Columbia River Chinook salmon, Upper Willamette River Chinook salmon, Columbia River chum salmon (*O. keta*), Snake River steelhead (*O. mykiss*), Upper Columbia River steelhead, Middle Columbia River steelhead, Upper Willamette River steelhead, and Lower Columbia River steelhead, or destroy or adversely modify designated critical habitat.

Pursuant to section 7 of the ESA, NOAA Fisheries has included reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary and appropriate to minimize the potential for incidental take associated with this project.

This document also serves as consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action will adversely affect designated EFH for coho salmon (*O. kisutch)* and Chinook salmon and starry flounder (*Platyichthys stellatus*). As required by section 305(b)(4)(A) of the MSA, conservation recommendations are included that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days after receiving an EFH conservation recommendation.

Questions regarding this letter should be directed to Christy Fellas of my staff in the Willamette Basin Habitat Branch of the Oregon State Habitat Office at 503.231.2307.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Laura Hicks, COE
John Gornick, COE
Scott Isaacson, Glacier Northwest

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Columbia River Sand & Gravel Dredging,
Columbia River Miles 90 to 96 and 98.5 to 101,
Columbia and Multnomah Counties, Oregon
(Corps No.: 1995000961)

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: NOAA's National Marine Fisheries Service, Northwest Region

Date Issued: June 23, 2004

for Michael R Crouse

Issued by: __________________
D. Robert Lohn
Regional Administrator

Refer to: **2003/01421**

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1. INTRODUCTION

1.1 Background

On October 6, 2003, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a letter from the U.S. Army Corps of Engineers (COE) requesting formal consultation pursuant to the Endangered Species Act (ESA) for the issuance of a permit under section 404 of the Clean Water (CWA) Act and section 10 of the Rivers and Harbors Act to Columbia River Sand & Gravel. On April 13, 2004, NOAA Fisheries requested and was granted a 30-day extension to complete this biological opinion (Opinion).

The COE determined the proposed action was likely to adversely affect the following ESA-listed species: Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), LCR steelhead (*O. mykiss*) and Columbia River (CR) chum (*O. keta*). Lower Columbia River/Southwest Washington (LCRSW) coho are a candidate for listing. Additionally, the following listed species are present in the action area: Snake River (SR) sockeye salmon (*O. nerka*), SR fall Chinook salmon (*O. tshawytscha*), SR spring/summer Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Upper Willamette River (UWR) Chinook salmon, SR steelhead, UCR steelhead, Middle Columbia River (MCR) steelhead and UWR steelhead.

References and dates listing status and ESA section 4(d) take prohibitions are in Table 1. Critical habitat is designated in the Columbia River for Snake River Evolutionary Significant Units (ESUs) only.

1.2 Proposed Action

This project is a renewal application for commercial sand dredging in and around the federally-authorized shipping channel in the Columbia River, to depths of at least -35 Columbia River Datum (CRD). The dredging areas are in two reaches between Columbia River Miles (RM) 90.0 - 96.0 and 98.5 - 101.0. These sites span Columbia and Multnomah Counties in Oregon, and Clark County in Washington.

Columbia River Sand & Gravel (CRSG) (a unit of Glacier Northwest, Inc.) proposes to remove up to 210,000 cubic yards of sand from the riverbed in the navigation channel and up to 100 feet from the channel lateral boundaries. The equipment proposed for use is a 235-foot hopper dredge with a single trailing suction arm. The suction pipe is 30 inches in diameter, but the head is screened so that individual openings are no more than 6 inches in any dimension. The system is powered by a 1,200 horsepower diesel engine and pump that transports the sand/water slurry to the three-compartment hopper deck. The hoppers hold approximately 1,500 cubic yards of sand. Dredge slurry water goes under the hopper, through a pipe and cycling system under the stern and back to the river. Decanted water may contain small amounts of fine sediment. Any turbidity created by releasing this water from the hopper will not exceed natural background turbidity by more than 10% as measured 100 feet upstream and downstream of in-water work.

The dredge is equipped with a Global Positioning System radio network between tug captain and dredge crews and fathometers to determine work area depths. Personnel on the dredge are trained and equipped to deal with hazardous materials. The upland disposal areas at Linnton and Vancouver are large enough to allow adequate settling for the proposed quantity of wet material.

The company has three sites where sand is pumped off the hopper dredge to upland facilities for sorting and sale. One site is on Port of Vancouver property, east of Vancouver, Washington. A second site is in the Linton area of northwest Portland along the west bank of the Willamette River. The third site is called Santosh, near Scappoose, Columbia County, Oregon. In accordance with National Pollutant Discharge Elimination System Permits through the states of Oregon and Washington, return flows at the offloading sites will be monitored for turbidity, temperature, flow, and additional water quality parameters. Also, CRSG has developed a spill control plan for the prevention, containment, control and cleanup of unplanned discharges at all upland disposal sites. Erosion control measures at these sites include adequate settling times in ponds and use of filter bags, sediment fences, silt curtains and leaving strips sufficient to prevent movement of soils.

1.3 Action Area

The action area is defined by NOAA Fisheries regulations (50 CFR 402) as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” The action area is Columbia RM 90 to 96 and 98.5 to 101, including the streambed, streambank, and water column, and 1000 feet upstream and downstream of the construction area.

Table 1. References for Additional Background on Listing Status, Biological Information, Protective Regulations, and Critical Habitat Elements for the ESA-Listed Species Considered in this Consultation.

Species ESU	Status	Critical Habitat[1]	Protective Regulations	Biological Information, Historical Population Trends
Chinook salmon (*O. Tshawytscha*)				
Snake River fall-run	T 4/22/92; 57 FR 14653[2]	12/28/93; 58 FR 68543	7/10/00; 65 FR 42422	Waples *et al*. 1991b; Healey 1991
Snake River spring/summer-run	T 4/22/92; 57 FR 14653[2]	10/25/99; 64 FR 57399[3]	7/10/00; 65 FR 42422	Matthews and Waples 1991; Healey 1991
Lower Columbia River	T 3/24/99; 64 FR 14308		7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 1991
Upper Willamette River	T 3/24/99; 64 FR 14308		7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 1991
Upper Columbia River spring-run	E 3/27/99; 64 FR 14308		7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 1991
Chum salmon (*O. keta*)				
Columbia River	T 3/25/99; 64 FR 14508		7/10/00; 65 FR 42422	Johnson *et al*. 1997; Salo 1991
Sockeye salmon (*O. nerka*)				
Snake River	E 11/20/91; 56 FR 58619	12/28/93; 58 FR 68543	11/20/91; 56 FR 58619	Waples *et al*. 1991a; Burgner 1991
Steelhead (*O. mykiss*)				
Lower Columbia River	T 3/19/98; 63 FR 13347		7/10/00; 65 FR 42422	Busby *et al*. 1995; 1996
Middle Columbia River	T 3/25/99; 64 FR 14517		7/10/00; 65 FR 42422	Busby *et al*. 1995; 1996
Upper Columbia River	E 8/18/97; 62 FR 43937		7/10/00; 65 FR 42422	Busby *et al*. 1995; 1996
Upper Willamette River	T 3/25/99; 64 FR 14517		7/10/00; 65 FR 42422	Busby *et al*. 1995; 1996
Snake River Basin	T 8/18/97; 62 FR 43937		7/10/00; 65 FR 42422	Busby *et al*. 1995; 1996

[1] Critical habitat designations (excluding Snake River Chinook and sockeye salmon) were vacated and remanded on May 7, 2002, by a Federal Court.

[2] Also see 6/3/92; 57 FR 23458, correcting the original listing decision by refining ESU ranges.

[3] This corrects the original designation of 12/28/93 (58 FR 68543) by excluding areas above Napias Creek Falls, a naturally-impassable barrier.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of these ESA-listed species for these species or destroy or adversely modify designated critical habitat. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

2.1.1 Biological Information

According to a recent draft of "Preliminary conclusions regarding the updated status of listed ESUs of West Coast salmon and steelhead," drafted by the West Coast Salmon Biological Review Team (BRT), a number of evolutionarily significant units (ESUs) are "likely to become endangered in the foreseeable future"(NOAA Fisheries 2003). Preliminary conclusions for each listed ESU considered in this Opinion are discussed below.

<u>LCR Chinook</u>
Natural-origin fish had parents that spawned in the wild as opposed to hatchery-origin fish whose parents were spawned in a hatchery. The abundance of natural-origin spawners ranges from completely extirpated for most of the spring-run populations, to over 6,500 for the Lewis River bright population. The majority of the fall-run tule populations have a substantial fraction of hatchery-origin spawners in the spawning areas and are hypothesized to be sustained largely by hatchery production. Exceptions are the Coweeman and Sandy River fall-run populations which have few hatchery fish spawning on the natural spawning areas. These populations have recent mean abundance estimates of 348 and 183 spawners, respectively. The majority of the spring-run populations have been extirpated largely as the result of dams blocking access to their high elevation habitat. The two bright Chinook populations (*i.e.* Lewis and Sandy) have relatively high abundances, particularly the Lewis.

In many cases, data were not available to distinguish between natural- and hatchery-origin spawners, so only total spawner (or dam count) information is presented. This type of figure can give a sense of the levels of abundance, overall trend, patterns of variability, and the fraction of hatchery-origin spawners. A high fraction of hatchery-origin spawners indicates that the population may potentially be sustained by hatchery production and not the natural environment. It is important to note that estimates of the fraction of hatchery-origin fish are highly uncertain since the hatchery marking rate for LCR fall Chinook is generally only a few percent and expansion to population hatchery fraction is based on only a handful of recovered marked fish.

<u>LCR Steelhead</u>
Based on the updated information provided in this report, the information contained in previous LCR status reviews, and preliminary analyses, the number of historical and currently viable populations have been tentatively identified. This summary indicates some of the uncertainty about this ESU. Like the previous BRT, the current BRT could not conclusively

identify a single population that is naturally self-sustaining. Over the period of the available time series, most of the populations are in decline and are at relatively low abundance (no population has recent mean greater than 750 spawners). In addition, many of the populations continue to have a substantial fraction of hatchery-origin spawners and may not be naturally self-sustaining.

<u>CR Chum</u>
A majority of the BRT votes for this ESU fell in the "likely to become endangered" category, with a minority falling in the "danger of extinction" category. Most or all of the risk factors identified previously by the BRT remain important concerns. The Technical Recovery Team (TRT) has estimated that close to 90% of the historic populations in the ESU are extinct or nearly so, resulting in loss of much diversity and connectivity between populations. The populations that remain are small, and overall abundance for the ESU is low. This ESU has showed low productivity for many decades, even though the remaining populations are at low abundance and density-dependent compensation might be expected. The BRT was encouraged that unofficial reports for 2002 suggest a large increase in abundance in some (perhaps many) locations. Whether this large increase is due to any recent management actions or simply reflects unusually good conditions in the marine environment is not known at this time, but the result is encouraging, particularly if it were to be sustained for a number of years.

<u>UCR Spring Chinook</u>
There are no estimates of historical abundance specific to this ESU before the 1930s. The drainages supporting this ESU are all above Rock Island Dam on the upper Columbia River. Rock Island Dam is the oldest major hydroelectric project on the Columbia River, beginning operations in 1933. Counts of returning Chinook have been made since the 1930s. Annual estimates of the aggregate return of spring Chinook to the Upper Columbia River are derived from the dam counts based on the nadir between spring and summer return peaks. Spring Chinook salmon spawn in three major drainages above Rock Island Dam: Wenatchee, Methow and Entiat Rivers. Historically, spring Chinook may have also used portions of the Okanogan River.

Grand Coulee Dam, completed in 1938, formed an impassable block to the upstream migration of anadromous fish. Chief Joseph Dam was constructed on the mainstem Columbia River downstream from Grand Coulee Dam and is also a block to anadromous fish. There are no specific estimates of historical production of spring Chinook from mainstem tributaries above Grand Coulee Dam. Habitat typical of that used by spring Chinook salmon in accessible portions of the Columbia River basin is found in the middle to upper reaches of mainstem tributaries above Grand Coulee Dam. It is likely that the historical range of this ESU included these areas.

<u>MCR Steelhead</u>
The MCR steelhead ESU includes steelhead populations in Oregon and Washington drainages upstream of the Hood River and Wind River systems, to and including the Yakima River. The Snake River is not included in this ESU. Major drainages in this ESU are the Deschutes, John

Day, Umatilla, Walla-Walla, Yakima, and Klickitat River systems. Almost all steelhead populations within this ESU are summer-run fish, the exceptions being winter-run components returning to the Klickitat and Fifteen Mile Creek watersheds. Most of the populations within this ESU are characterized by a balance between 1- and 2-year-old smolt outmigrants. Adults return after 1 or 2 years at sea.

Hatchery facilities are in a number of drainages within the geographic area of this ESU, although there are also subbasins with little or no direct hatchery influence. The John Day River system is a large river basin supporting an estimated five steelhead populations. The basin has not been outplanted with hatchery steelhead, and out-of-basin straying is believed to be low. The Yakima River system includes 4 to 5 populations. Hatchery production in the basin was relatively limited historically, and was phased out in the early 1990s. The Umatilla, the Walla-Walla, and the Deschutes River systems each have ongoing hatchery production programs based on locally-derived broodstocks. Straying from out-of-basin production programs into the Deschutes River is identified as a chronic occurrence.

Blockages have prevented access to sizable steelhead production areas in the Deschutes River and the White Salmon River. In the Deschutes River, Pelton Dam blocks access to upstream habitat historically used by steelhead. Condit Dam, constructed in 1913, blocked access to all but 2 to 3 miles of habitat suitable for steelhead production in the Big White Salmon River (Rawding 2001). Substantial populations of resident trout exist in both areas.

UCR Steelhead

The life-history patterns of UCR steelhead are complex. Adults return to the Columbia River in the late summer and early fall, most migrating relatively quickly up the mainstem to their natal tributaries. A portion of the returning run overwinters in the mainstem reservoirs, passing over the upper and mid-Columbia River dams in April and May of the following year. Spawning occurs in the late spring following entry into the river. Juvenile steelhead spend 1 to 7 years rearing in freshwater before migrating to the ocean. Smolt outmigrations are predominately age 2 and age 3 juveniles. Most adult steelhead return after 1 or 2 years at sea, starting the cycle again.

Harvest rates on upper river steelhead have been substantially cut back from historical levels. Direct commercial harvest of steelhead in non-Indian fisheries was eliminated by legislation in the early 1970s. Incidental impacts in fisheries directed at other species continued in the lower river, but at substantially reduced levels. In 1985, steelhead recreational fisheries in this region (and in other Washington tributaries) were changed to mandate release of wild fish.

Hatchery returns predominate the estimated escapement in the Wenatchee, Methow, and Okanogan River drainages. The effectiveness of hatchery spawners relative to their natural counterparts is a major uncertainty for both populations. While the return timing into the Columbia River is similar for both wild and hatchery steelhead returning to the Upper Columbia, the spawning timing in the hatchery is accelerated. The long-term effects of such acceleration on the spawning timing of returning hatchery-produced adults in nature is not known. We have no direct information on the relative fitness of Upper Columbia progeny with at least one parent of hatchery origin.

<u>UWR Chinook</u>

All spring Chinook in the ESU, except those entering the Clackamas River, must pass Willamette Falls. There is no assessment of the ratio of hatchery-origin to wild-origin Chinook passing the falls, but the majority of fish are undoubtedly of hatchery origin. (Natural-origin fish are defined has having had parents that spawned in the wild, as opposed to hatchery-origin fish whose parents spawned in a hatchery.)

No formal trend analyses were conducted on any of the UWR Chinook populations. The two populations with long-time series of abundance (Clackamas and McKenzie) have insufficient information on the fraction of hatchery-origin spawners to permit a meaningful analysis. In general, the majority of the populations in this ESU are extirpated, or nearly so, or are considered not self-sustaining. The exceptions are the Clackamas and McKenzie River populations.

<u>UWR Steelhead</u>

Populations of UWR steelhead are at relatively low abundance, and overall abundance of the ESU has been steeply declining since 1988, with adult returns improving in 2001 and 2002 (NOAA Fisheries 2003). It is uncertain whether the recent increases can be sustained. The previous BRT was concerned about the potential negative interaction between non-native summer steelhead and wild winter steelhead (cited in NOAA Fisheries 2003). The loss of access to historical spawning grounds because of dams was considered a major risk factor.

<u>SR Spring/Summer Chinook</u>

This ESU includes production areas that are characterized by spring-timed returns, summer-timed returns, and combinations from the two adult timing patterns. Runs classified as spring Chinook are counted at Bonneville Dam from early March and to the first week of June, while runs classified as summer Chinook return to the Columbia River from June through August. Returning fish hold in deep mainstem and tributary pools until late summer, when they emigrate up into tributary areas and spawn. In general, spring-run Chinook tend to spawn in higher elevation reaches of major Snake River tributaries in mid- through late August, while summer-run SR Chinook spawn approximately 1 month later than spring-run fish.

Spring and summer Chinook from the Snake River basin exhibit stream type life history characteristics (Healey 1983). Eggs are deposited in late summer and early fall, incubate over the following winter, and hatch in late winter and early spring of the following year. Juveniles rear through the summer, overwinter, and migrate to sea in the spring of their second year of life. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer rearing and/or overwintering areas. SR spring/summer Chinook return from the ocean to spawn primarily as 4 and 5 year-old fish, after 2 to 3 years in the ocean. A small fraction of the fish return as 3-year-old ‘jacks’, heavily predominated by males.

SR Fall Chinook

SR fall Chinook spawn above Lower Granite Dam in the mainstem Snake River and in the lower reaches of major tributaries entering below Hells Canyon Dam. Adult fall Chinook enter the Columbia River in July and August. The Snake River component of the fall Chinook run migrates past the Lower Snake River mainstem dams in September and October. Spawning occurs from October through November. Juveniles emerge from the gravels in March and April of the following year. S R fall Chinook are subyearling migrants, moving downstream from natal spawning and early rearing areas from June through early fall.

Fall Chinook returns to the Snake River generally declined through the first half of this century (Irving and Bjornn 1981). In spite of the declines, the Snake River basin remained the largest single natural production area for fall Chinook in the Columbia drainage into the early 1960s (Fulton 1968). Spawning and rearing habitat forSR fall Chinook was significantly reduced by the construction of a series of Snake River mainstem dams. Historically, the primary fall Chinook spawning areas were on the upper mainstem of the Snake River. Currently, natural spawning is limited to the area from the upper end of Lower Granite Reservoir to Hells Canyon dam and the lower reaches of the Imnaha, Grande Ronde, Clearwater, and Tucannon Rivers.

SR Steelhead

The Snake River steelhead ESU is distributed throughout the Snake River drainage system, including tributaries in southwest Washington, eastern Oregon and north/central Idaho (NMFS, 1996). SR steelhead migrate a substantial distance from the ocean (up to 1,500 kilometers) and use high elevation tributaries (typically 1,000 to 2,000 meters above sea level) for spawning and juvenile rearing. SR steelhead occupy habitat that is considerably warmer and drier (on an annual basis) than other steelhead ESUs. SR steelhead are generally classified as summer-run, based on their adult run timing patterns. Summer steelhead enter the Columbia River from late June to October. After holding over the winter, summer steelhead spawn during the following spring (March to May). Managers classify up-river summer steelhead runs into to groups based primarily on ocean age and adult size on their return to the Columbia River. A-run steelhead are predominately age-1 ocean fish, while B-run steelhead are larger and predominated by age-2 ocean fish. Most basins within the ESU, with the exception of the Middle Fork Salmon River, have some sort of artificial production.

2.1.2 Evaluating Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402. NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of: (1) Defining the biological requirements and status of the listed species; and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NOAA Fisheries' analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration, spawning, and rearing of listed species under the existing environmental baseline.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the status of the listed species, taking into account population size, trends, distribution, and genetic diversity. To assess the status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful rearing and migration. The status of the listed species, based on their risk of extinction, has not significantly improved since the species were listed.

2.1.4 Environmental Baseline

The Columbia River is naturally a very dynamic system. It has been affected and shaped over eons by a variety of natural forces, including volcanic activity, storms, floods, natural events, and climatological changes. These forces had and continue to have a significant influence on biological factors, habitat, inhabitants, and the whole riverine and estuarine environment of the Columbia River.

Over the past century, human activities have dampened the range of physical forces in the action area and resulted in extensive changes in the Lower Columbia River and estuary. To a significant degree, the risk of extinction for salmon stocks in the Columbia River basin has increased because complex freshwater and estuarine habitats needed to maintain diverse wild populations and life histories have been lost and fragmented. Estuarine habitat has been lost or altered directly through diking, filling, and dredging. Estuarine habitat has also been removed indirectly through changes to flow regulation that affect sediment transport and salinity ranges of specific habitats within the estuary. Not only have rearing habitats been removed, but the connections among habitats needed to support tidal and seasonal movements of juvenile salmon have been severed.

The Lower Columbia River estuary lost approximately 43% of its historic tidal marsh (from 16,180 to 9,200 acres) and 77% of historic tidal swamp habitats (from 32,020 to 6,950 acres) between 1870 and 1970 (Thomas 1983). One example is diking and filling floodplains that were formerly connected to the tidal river, which has resulted in the loss of large expanses of low-energy, off-channel habitat for salmon rearing and migrating during high flows. Similarly, diking estuarine marshes and forested wetlands within the estuary has removed most of these important off-channel habitats. Sherwood *et al.* (1990) estimated that the Columbia River estuary lost 20,000 acres of tidal swamps, 10,000 acres of tidal marshes, and 3,000 acres of tidal flats between 1870 and 1970.

Within the Lower Columbia River, diking, river training devices, such as pile dikes and rip-rap, railroads, and highways have narrowed and confined the river to its present form. Between the Willamette River and the mouth of the Columbia River, diking, flow regulation, and other human activities have resulted in a confinement of 84,000 acres of floodplain that likely contained large amounts of tidal marsh and swamp. The Lower Columbia River's remaining tidal marsh and swamp habitats are in a narrow band along the Columbia River and its tributaries' banks and undeveloped islands.

Since the late 1800s, the COE has been responsible for maintaining navigation safety on the Columbia River. During that time, the COE has undertaken many actions to improve and maintain the navigation channel. The channel has been dredged periodically to make it deeper and wider, as well as being annually dredged for maintenance purposes. To improve navigation and reduce maintenance dredging, the navigation channel has been realigned, and hydraulic control structures, such as in-water fills, channel constrictions, and pile dikes, have been built. Most of the present-day pile dike system was built from 1917 to 1923, and from 1933 to 1939, with an additional 35 pile dikes constructed between 1957 and 1967.

The existing navigation channel pile dike system consists of 256 pile dikes, totaling 240,000 linear feet. Ogden Beeman and Associates (1985) termed these COE activities "river regulation", and noted that navigation channel maintenance activities, for the 100-year period before their 1985 report, required closing of river side channels, realigning riverbanks, removing rock sills, stabilizing riverbanks, and placing river "training" features. Most of these baseline river training features and habitat alterations were constructed before any salmonids were placed on the list of endangered and threatened species.

Flow regulation, water withdrawal and climate change have reduced the Columbia River's average flow and altered the seasonality of the Columbia River flows, sediment discharge, and turbidity, which have in turn changed the estuarine ecosystem (National Research Council, 1996; Sherwood *et al.*, 1990; Simenstad *et al.*, 1990, 1992, Weitkamp, 1994). Annual spring freshet flows through the Columbia River estuary are approximately one-half of the traditional levels that flushed the estuary and carried smolts to sea, and the total sediment discharge is approximately one-third of 19th Century levels. For instance, flow regulation that began in the 1970s has reduced the 2-year flood peak discharge, as measured at The Dalles, Oregon, from 580,000 cubic feet per second (cfs) to 360,000 cfs (COE, 1999).

Decreased spring flows and sediment discharges have also reduced the extent, thickness, speed of movement, and turbidity of the plume that extended far out and south into the Pacific Ocean during the spring and summer (Cudaback and Jay, 1996; Hickey *et al.*, 1997). Changes in estuarine bathymetry and flow have altered the extent and pattern of salinity intrusion into the river and have increased stratification and reduced mixing (Sherwood *et al.*, 1990).

These aforementioned physical changes also affect other factors in the riverine and estuarine environment. Tides raise and lower river levels at least 4 feet, and up to 12 feet, twice every day. The historical range for tides was probably similar, but seasonal ranges and extremes in water surface elevations have certainly changed because of river flow regulation. The salinity level in areas of the estuary can vary from zero to 34 parts per thousand (ppt) depending on tidal intrusion, river flows, and storms. Flow regulation has affected the upstream limit of salinity intrusion. The salinity wedge is believed to have ranged from the river mouth to as far upstream as Columbia RM 37.5 in the past. It is now generally believed that the salinity intrusion ranges between the mouth and Columbia RM 30. The riverbed within the navigation channel is composed of a continuously moving series of sand waves that can migrate up to 20 feet per day at flows of 400,000 cfs or greater. This rate of river discharge is not experienced as often as it was before flow regulation in the Columbia River.

Water quality is another important aspect the environmental condition of the Lower Columbia River and ecosystem that has the potential to affect salmonid's growth and survival. The uptake of toxicants during juvenile salmonid residence in the Lower Columbia River and estuary (NWFSC Environmental Conservation Division 2001) can affect their growth and survival. In field studies, juvenile salmon from sites in the Pacific Northwest show demonstrable effects, including immunosuppression, reduced disease resistance, and reduced growth rates, due to contaminant exposure during their estuarine residence (Arkoosh *et al.* 1991, 1994, 1998; Varanasi *et al.* 1993; Casillas *et al.* 1995a,b, 1998a).

<u>Description of the Environmental Baseline for ESA-listed Salmonids the Lower Columbia River and Estuary</u>

All ESA-listed salmonids must pass through the Lower Columbia River twice: Once as juveniles en route to the Pacific Ocean, and again as adults when they return to spawn. The Lower Columbia River serves three primary roles for outmigrating juveniles as they transition from shallow, freshwater environments to the ocean: (1) A place where juvenile fish can gradually acclimate to salt water; (2) a feeding area (*i.e.*, main, and tidal channel, unvegetated shoals, emergent and forested wetlands, and mudflats) capable of sustaining increased growth rates; and (3) a refuge from predators while fish acclimate to salt water.

Thus, though the Lower Columbia River and estuary is important to the survival and recovery of all ESA-listed salmonids, it is particularly important to ocean-type salmon. These stocks may be particularly sensitive to ecosystem changes because of their longer residence times and dependence on this portion of the river for growth and survival.

Ocean-type salmon ESUs in the Columbia River include three Chinook ESUs (LCR, SR fall, and UWR) and the CR chum salmon ESU. These four ESUs are the most likely to be affected by potential impacts of the proposed project, and thus are discussed in detail below. Ocean-type salmon migrate downstream to and through the estuary as subyearlings, generally leaving the spawning area where they hatched in the days and months following their emergence from the gravel. Consequently, subyearlings commonly spend weeks to months rearing within the action area before reaching the size at which they migrate to the ocean.

Young salmonids must undergo a physiological transition and develop enough strength, energy, and reserve capacity to adapt to and survive the physical and biological challenges of the ocean environment, as well as to successfully obtain prey in that environment. Juvenile salmonids appear to reach the threshold for this transitional state at a size of 70 to 100 mm. Before fish reach this size, their ocean survival would be difficult.

The first outbound migrants of the LCR fall Chinook and CR chum may arrive in the action area as early as late February (Herrmann 1970; Craddock *et al.*, 1976; Healey 1980; Congleton *et al.*, 1981; Healey 1982; Dawley *et al.*, 1986; Levings *et al.*, 1986). The majority of these fish are present from March through June. Outbound SR fall Chinook begin their migration much farther upstream and arrive in the Lower Columbia River approximately a month later.

Ocean-type subyearlings arrive in the lower river and estuarine portion of the proposed action area at a small size. The earliest migrants can be as small as 30 to 40 mm fork length (from snout to fork in the tail) when they arrive because some of these fish hatch only a short distance upstream from the action area. Later, spring migrants are generally larger, ranging up to 50 to 80 mm. Subyearlings from the mid-Columbia and Snake Rivers tend to be substantially larger (70 to 100 mm) by the time they reach the Lower Columbia River. The larger size of the SR fall Chinook, compared with the LCR Chinook and CR chum, likely indicates some differences in suitable habitat. The larger subyearlings from the Snake River can likely use a greater range of depth and current conditions than the subyearlings of the Lower Columbia River ESUs can.

A number of physical characteristics in the riverine reach affect the quality and quantity of habitat available for salmonids. These include the availability of prey, temperature, turbidity, and suspended solids. Subyearlings are commonly found within a few meters of the shoreline at water depths of less than 1 meter. Although they migrate between areas over deeper water, they generally remain close to the water surface and near the shoreline during rearing, favoring water no more than 2 meters deep and areas where currents do not exceed 0.3 meters per second. They seek lower energy areas where waves and currents do not require them to expend considerable energy to remain in position while they consume the invertebrates that live on or near the substrate. These areas are characterized by relatively fine-grain substrates. However, it is not uncommon to find young salmonids in areas with steeper and harder substrates, such as sand and gravel.

Young Chinook in the Lower Columbia River action area consume a variety of prey; primarily insects in the spring and fall and *Daphnia* from July to October (Craddock *et al.*, 1976). *Daphnia* are the major prey during the summer and fall months, selected more than other planktonic organisms.

Corophium is commonly discussed as a primary prey item of juvenile salmonids in the Lower Columbia River. *Corophium salmonis* is a euryhaline species tolerating salinities in the range of zero to 20 ppt (Holton and Higley 1984). It is one of several major prey species consumed by juvenile Chinook under existing conditions. No data are available that indicate its historical role in the diet of Columbia River salmon before substantial modification of the river system. Nutritionally, *Corophium* may not be as desirable as other food sources for young salmon. According to Higgs *et al.,* (1995), gammarid amphipods such as *Corophium* are high in chitin and ash and low in available protein and energy relative to daphnids and chironomid larvae.

Adult salmon returning to the Columbia River migrate through the river mouth throughout the year. The majority move through this area from early spring through autumn.

The action area, Columbia RM 90-96 and 98.5-101, is part of the existing designated Federal navigation channel. This channel is frequently dredged to maintain the authorized depth of -40 feet CRD plus a 5-foot overdredge. Previously, CRSG has dredged in this area for many years, and previous permits have been issued to permit dredging to -48 CRD.

2.1.5 Analysis of Effects

<u>Effects of the Proposed Action</u>
Potential effects of the proposed action on listed salmonids include: (1) Potential for direct take, harm or disturbance during in-water work; and (2) an increase in turbidity from upland disposal return water. Long-term effects on bathymetry and habitat should be monitored since the effects from the proposed project are uncertain.

<u>Turbidity from Dredging</u>
The effects of suspended sediment and turbidity on fish, as reported in the literature, range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al.* 1980, Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Sigler *et al.* 1984, Lloyd

1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd, 1987).

Turbidity from the proposed project is expected to minor and limited in space and time. The cutter suction head will be operated in the sediment to provide effective removal of material from the dredging area. No washing of equipment or material will occur in the water. Additionally, turbidity from dredging operations and disposal of material will be monitored to ensure that turbidity caused by in-water work and return flow from disposal sites does not exceed background turbidity by more than 10% as measured 100 feet upstream and downstream from in-water work. Turbidity from the proposed project is not expected to have significant impacts on listed salmonids in the mainstem Columbia River.

<u>Dredging Operations</u>
Hydraulic suction dredging may entrain juvenile salmonids. When juvenile salmonids come within the "zone of influence" of the cutter head, they may be drawn into the suction pipe (Dutta 1976, Dutta and Sookachoff 1975a). Dutta (1976) reported that salmon fry were entrained by suction dredging in the Fraser River and that suction dredging during juvenile migration should be controlled. Further testing in 1980 by Arseneault (1981) resulted in entrainment of chum and pink salmon, but the numbers were low relative to the total number of salmonids outmigrating (.0001 to .0099%).

The Portland District COE conducted extensive sampling within the Columbia River in 1985 to 1988 (Larson and Moehl 1990), and again from 1997 to1998. In the 1985 to 1988 study, no juvenile salmon were entrained, and the 1997 to 1998 study resulted in entrainment of only two juvenile salmon. McGraw and Armstrong's (1990) examination of fish entrainment rates in Grays Harbor from 1978 to 1989, resulted in only one juvenile salmon being entrained. Stickney (1973) also found no evidence of fish mortality while monitoring dredging activities along the Atlantic Intracoastal Waterway. These studies were on deep water areas associated with main channels.

The navigation channel is federally designated and maintained to the required depth by the COE. The applicant proposes to dredge material within the channel in lieu of the COE dredging this party of the channel. If the applicant did not dredge in the action area, the COE would maintain the action area to depth.

NOAA Fisheries expects few, if any, listed fish to be present in the action area at depths greater than -35 CRD in close proximity to the cutter suction head. To further minimize impacts to juvenile salmonids, dredging outside the navigation channel where depths may be -35 CRD, operations should occur during the in-water work window of November 1 - February 28.

<u>Disposal and Return Water</u>
Disposal and return water may harm listed salmonids due to the effects of turbidity as discussed above. All dredged material from the proposed project will be deposited in upland disposal sites,

no disposal will be in-water. After the material is settled out from the slurry mix of sand and water, the return water will be controlled and monitored as it enters the Columbia River. Return water from the upland disposal sites is not expected to have significant effects on listed species moving past these areas.

Suspended Sediment

Proposed dredging activities may influence suspended sediment concentrations in the Columbia River. In areas beside dredges and shoreline disposal operations, increases in suspended sediment concentrations may temporarily increase local water column turbidity.

Contaminants associated with dredged and disposed sediments may be resuspended in the ecosystem. However, much of the material to be dredged from the navigation channel will originate from existing sand waves, dynamic natural features of the river bottom that are constantly on the move due to current action. These sand waves contain a small percentage of fine sediments and organic material, and thus have the potential to carry only a limited amount of contaminants into natural resuspension from current action or dredging and disposal.

NOAA Fisheries believes that project-related changes to suspended sediment could affect the habitat-forming (accretion) process of sediment accretion and erosion. The project-related addition to the suspended sediment load may result in a limited increase in accretion of sediment in lateral habitat areas. It is unlikely that the proposed project effect will have any significant benefit to habitats used by ESA-listed salmonids.

Bedload

One of the sources of material for habitat-forming processes in the estuary is sand from upstream areas. This sand is important to the formation of tidal marsh, swamp, and shallow water and flats habitat. The removal of sand from the river via dredging and upland disposal will not alter the ongoing, natural sediment transport process towards the estuary. The volume and rate of the bedload movement is not expected to change with project activities. The volume of sand to be dredged for the proposed project represents a small fraction of the total volume of sand in the riverbed. In addition, transport potential, rather than sand supply, is the limiting factor in sediment supply to the estuary. Therefore, it is likely that the impact to bedload processing of sand removal associated with this project will be of a limited nature. The proposed action will dredge material from the existing navigation channel, which the applicant has been maintaining at the same depth for 10 or more years.

Bathymetry

Bathymetric changes will occur in and beside the navigation channel. Dredging will lower the riverbed, in and beside the navigation channel. Long-term riverbed adjustments will occur on adjacent side slopes. Based on analysis from the Columbia River Federal Navigation Channel Improvements Project (NOAA Fisheries 2002), water surface elevation may change and affect habitat available to salmonids.

Based on the impacts to water depth-associated habitat opportunity, NOAA Fisheries concludes that there will be limited, short-term effects on feeding habitat opportunity or refugia for yearling and older salmonids. In particular, the changes in water surface elevations projected within the estuarine and riverine reaches are not likely to alter the amount or location of refugia. In addition, changes to river current velocity from the proposed dredging are anticipated to be small and will not affect the function of the available refugia. This is because yearlings are commonly found in areas of both low and relatively high current speeds as they rapidly migrate downstream. Generally, yearlings are not strongly shoreline-oriented, although some are found in shoreline areas.

In addition, yearlings tend to be surface-oriented, but feed over a relatively wide range of depths, from the surface, to 5 to 10 meters deep. For subyearling fish, changes in refugia and feeding habitat opportunity may be more pronounced. While short-term impacts appear to be unlikely, the long-term impacts to habitat opportunity and refugia from these limited bathymetric and hydraulic changes cannot be quantified and are therefore uncertain. Any long-term, negative changes in bathymetric or hydraulic conditions may harm these species' aquatic habitat, thereby negatively effecting refugia and habitat opportunity for these species. Therefore, any effects to these habitat conditions are important to monitor. Since the applicant has been dredging to the proposed depth previously in the same action area current bathymetric conditions are not likely to change, however, bathymetry should be monitored annually to determine if the proposed project is having additional effects on listed salmonids.

2.1.5.1 Effects to Critical Habitat

NOAA Fisheries designates critical habitat based on physical and biological features that are essential to the listed species. Essential elements for designated critical habitat include: Substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage.

Critical habitat is designated for Snake River stocks only. See Table 1 for more information about the critical habitat designations. Effects to critical habitat are included in the effects description expressed above.

2.1.6 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater effects to listed species than presently occurs. Between 1990 and 2000, the population of Columbia County increased by 16.0%.[4] Thus, NOAA Fisheries assumes that future private and state actions will continue within the action area, increasing as population density rises. As the human population in the state continues to grow, demand for actions similar to the subject project likely will continue to increase as well. Each subsequent action may have only a small incremental effect, but taken together they may have a significant effect that would further degrade the watershed's environmental baseline and undermine the improvements in habitat conditions necessary for listed species to survive and recover.

2.1.7 Conclusion

NOAA Fisheries has determined that, based on the available information, the proposed action is not likely to jeopardize the continued existence of listed species and not likely to destroy or adversely modify designated critical habitat. NOAA Fisheries used the best available scientific and commercial data to analyze the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects.

These conclusions are based on the following considerations: (1) The work will be completed in waters at least -35 CRD, where few numbers of listed species are likely to be present; (2) any increases in sedimentation and turbidity in the project area will be minor, local, and short-term; (3) best management practices will be followed for all dredging activities; (4) water quality will be monitored during dredging and for return flows at upland disposal sites; and (5) the proposed action is not likely to impair properly functioning habitat, or retard the long-term progress of impaired habitat toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

2.1.8 Reinitiation of Consultation

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 USC 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include

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[4] U.S. Census Bureau, State and County Quickfacts, Columbia County, Oregon. Available at http://quickfacts.census.gov/qfd/states/41/41009.html

significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 222.102] Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

An incidental take statement specifies the impact of any incidental taking of listed species. It also provides reasonable and prudent measures that are necessary to minimize the effects of take and sets forth non-discretionary terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of the Take

NOAA Fisheries expects incidental take to occur as a result of proposed action actions that will harm, injure or kill Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), LCR steelhead (*O. mykiss*) and Columbia River (CR) chum (*O. keta*), Snake River (SR) sockeye salmon (*O. nerka*), SR fall Chinook salmon (*O. tshawytscha*), SR spring/summer Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Upper Willamette River (UWR) Chinook salmon, SR steelhead, UCR steelhead, Middle Columbia River (MCR) steelhead and UWR steelhead. Although NOAA Fisheries expects the habitat-related effects of these actions to cause some level incidental take within the action area, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take because of those habitat-related effects. In instances such as these, NOAA Fisheries provides a measurable level of habitat disturbance or change that is causally related to the effects of the proposed action to provide a yardstick for reinitiation.

The extent of the take is limited to disturbance resulting from dredging activities within the action area. The action area is the Columbia River from RM 90-96 and 98.5-101 to a depth of -48 CRD in the navigation channel and 100 feet laterally, including the streambed, streambank, water column, and adjacent riparian zone, and 1000 feet upstream and 1000 feet downstream of the dredging area. Turbidity shall not exceed 10% over natural background turbidity, measured 100 feet upstream and downstream of in-water work

2.2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The COE has the continuing duty to regulate the activities covered in this incidental take statement. If the COE fails to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(a)(2) may lapse.

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to avoid or minimize take of listed salmonid species resulting from the action covered by this Opinion.

The COE shall include measures that will:

1. Complete a comprehensive monitoring and reporting program to ensure implementation of these conservation measures are effective at minimizing the likelihood of take from permitted activities.

2. Avoid or minimize incidental take from dredging by excluding unauthorized permit actions and applying permit conditions or project specifications that avoid or minimize adverse effects to riparian and aquatic systems.

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the COE must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity.

1. To implement reasonable and prudent measure #1 (monitoring), the COE shall:

    a. Implementation monitoring. Ensure that the applicant submits a monitoring report. Each project level monitoring report will include the following information, submitted to NOAA Fisheries and the COE annually, by December 31.
        i. Project identification
            (1) Applicant name, permit number, and project name.
            (2) Type of activity.
            (3) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
            (4) COE contact person.
            (5) Starting and ending dates for work completed.
        ii. Other Data. Project-specific data, as appropriate for individual projects, including the following:
            (1) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
            (2) Maintenance dredging.

(a) Volume of dredged material, reported annually by river mile.
(b) Water depth before dredging and within one week of completion.
(c) Verification of upland dredge disposal.
(d) Bathymetric surveys throughout project area.
(e) Dates of maintenance inside and outside the designated navigation channel.

(3) Turbidity monitoring.
(a) Monitor turbidity to insure that it does not exceed 10% over natural background turbidity, measured 100 feet upstream and downstream of in-water work
(b) Provide copies of all turbidity monitoring reports to NOAA Fisheries.

b. NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360.418.4246. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

2. To implement reasonable and prudent measure #2 (dredging), the COE shall:

a. Dredge operation. Operate dredges as follows:
i. Keep hydraulic dredge intakes at or just below the surface of the material being removed, although the intake may be raised for brief periods of purging or flushing.
ii. Spoil disposal. Place dredge spoils only in the Vancouver, Linnton, and Santosh upland disposal locations.
iii. Timing. Dredging within the navigation channel may occur year-round. Dredging outside the navigation channel shall occur between November 1 and February 28.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305(b)(4)(A)).

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10), and "adverse effect" means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas *et al.* (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the COE.

3.3 Proposed Actions

The proposed action and action area are detailed above in sections 1.2 and 1.3 of this Opinion. The action area includes habitats that have been designated as EFH for various life-history stages of starry flounder (*Platyichthys stellatus*), Chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.1.5 of this document, the proposed action will result in short-term adverse effects to a variety of habitat parameters. NOAA Fisheries believes that the proposed action will cause a minor, short-term degradation of anadromous salmonid habitat due to increases in turbidity. Minimization measures will be incorporated into the construction methods to reduce adverse impacts to EFH.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action will adversely affect the EFH for starry flounder and Chinook and coho salmon.

3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the COE it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. However, the terms and conditions outlined in section 2.2.3, except monitoring and the disposition of any individual fish injured or killed during dredging operations, are generally applicable to designated EFH for the species designated in section 3.3, and address these adverse effects. Consequently, NOAA Fisheries incorporates them here as EFH conservation recommendations.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The COE must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(k)).

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